Space Weather Forecast

Issued on Sunday, 31 October 2021 at 01:23 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

Space Weather Forecast Headline: CME arrival expected day 1 (31st) with G1/G2 Minor to Moderate storms and isolated G3 Strong Storms. G3 Watch issued.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity was low, with a number of common-class flares detected. There are currently three sunspot regions visible, the most complex of which is in the northeast disc, but with no notable flaring observed. No Earth-directed coronal mass ejections (CMEs) were seen.

Solar Wind / Geomagnetic Activity: The solar wind speed was at background levels, but with an increasing trend during the evening of the 30th. Its magnetic field was initially weak, but became moderately strong during the evening with a period of moderate strength in the north-south direction. This was likely due to the arrival of a weak CME which left the Sun on the 26th, and not due to the anticipated larger and more notable CME which has yet to arrive. Resultant geomagnetic activity was Quiet for much of the day, but become Active 2100-2400.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) decreased from Minor storm levels to be just below by the end of the period.

Four-Day Space Weather Forecast Summary

Solar Activity: Low solar activity is forecast with a slight chance of moderate-class flares, most likely from the sunspot in the northeast disc.

Solar Wind / Geomagnetic Activity: A large CME from the strong flare on the 28th has yet to arrive at Earth, and is still expected in the coming hours of day 1 (31st). Geomagnetic activity is expected increase to give Minor to Moderate geomagnetic storms are expected, with a likelihood of isolated Strong storms. Geomagnetic activity is then expected to gradually subside day 2 and 3 (1st and 2nd) with an eventual return to mainly Unsettled levels, and a chance of Active intervals. A further strengthening of the solar wind is then possible day 4 (3rd), with a chance of Minor geomagnetic Storms. There is still a chance of some visible aurora or northern parts of the UK early on the 31st.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) will continue declining towards background levels through the period, with no further solar radiation storms forecast.

Issued by Met Office Space Weather Advisor, Tel: +44 (0) 330 135 4254 Email: moswoc@metoffice.gov.uk

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	90	60	20	30
Strong	G3	No	60	10	1	1
Severe	G4	No	10	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	No	20	20	20	20
Very Active	R3 to R5 X	No	2	2	2	2

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	Yes	20	2	2	2
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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